ARM CPMWG Mixed-Phase Cloud Model Intercomparison

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Model Name and History:

Long Name: University of Wisconsin Non-Hydrostatic Modeling System

Acronym: UW_NMS_BULK (Bulk Microphysics)

UW_NMS_SHIPS (Spectral Habitat Ice Prediction System)

Short Name: UW-NMS or NMS

Generic Predecessor: UW-RAMS

Model Type: 2D

Numerical Domain:

X-Direction size: n/a Y-Direction size: 60 km

Z-Direction size: b1, b2: 15860 m

b3: 8835 m

X-Direction pts: 3
Y-Direction pts: 300
Z-Direction pts: 60
X-Direction grid size: 200 m
Y-Direction grid size: 200 m

Z-Direction grid size: b1, b2: 30 m for first 25 points, then stretched by 110%

until a max size of 750 m.

b3: 15 m for first 25 points, then stretched by 110% until a

max size of 750 m.

Time Step: 2 s

Numerical Technique:

Numerical Method: Finite differencing

Advection Scheme: 2nd order leapfrog (dynamics) and Crowley (scalars)

Time Scheme:

Dynamical Equations: Quasi-compressible

Numerical Diffusion:

Lateral Boundary Conditions; Periodic

Upper Boundary Condition: Absorbing layer

Translation Velocity: n/a

Physical Parameterizations:

Surface Flux Parameterization for heat, moisture, momentum: Louis (1979)

Longwave Radiation Parameterization: Pannegrosi Shortwave Radiation Parameterization: Pannegrosi Radiative Fluxes above the computational domain:

Microphysical Parameterization: Bulk (similar to CSU-RAMS: Flattau et al. (1989)) Turbulence Closure: 1.5 level Local eddy-diffusivity based diffusion (K based on TKE)

Documentation:

Flaau, P.J., G.J. Tripoli, J. Verlinde, and W.R. Cotton, 1989: The CSU-RAMS Cloud Microphysics Module: General Theory and Code Documentation, Colorado State University, Department of Atmospheric Science, Fort Collins, CO, 88 pp.

Tripoli, G.J., 1992: A Nonhydrostatic Mesoscale Model Designed to Simulate Scale Interaction. *Monthly Weather Review*, **120**, 1342-1359.